

REMARKS/ARGUMENTS

In view of the foregoing amendments and the following remarks, the applicants respectfully submit that the pending claims are not anticipated under 35 U.S.C. § 102. Accordingly, it is believed that this application is in condition for allowance. **If, however, the Examiner believes that there are any unresolved issues, or believes that some or all of the claims are not in condition for allowance, the applicant respectfully requests that the Examiner contact the undersigned to schedule a telephone Examiner Interview before any further actions on the merits.**

The applicant will now address each of the issues raised in the outstanding Office Action.

Election

The applicants elect the claims of group I, namely, claims 1-33. Non-elected claim 34 has been canceled.

Objections

Claim 17 is objected to because of a minor informality. Claim 17 has been amended to add a period at the end of the claim.

Rejections under 35 U.S.C. § 102

Claims 1-33 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,747,971 ("the

Hughes patent"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

Regarding independent claims 1 and 17, the Hughes patent does not teach a method for matching a non-empty virtual output queue (VOQ) of the input module with an outgoing link in the input module, and further matching the outgoing link (of the input module) with an outgoing link of one of the central modules.

The Hughes patent merely teaches a method where a request controller 314 (which the Examiner contends is an arbiter) constructs a switch frame 315a-h (See Figure 3 of the Hughes patent.), where each switch frame contains service requests for selected cells queued in the ingress port 304a (input module). Frames 315a-h are sent to the switch planes 309a-h (central modules). (See col.6, lines 64-67; col.7, lines 1-4, and Figure 3 of the Hughes patent.) Thus, the Examiner contends that, essentially, the Hughes patent is matching a non-empty VOQ 312a-312n and 313 with a switch plane 309a-h (central module), apparently by assigning cells to a particular row of a switch frame. However, since each row of a switch frame can include requests and/or cells from more than VOQ, it does not match the outgoing link (of the input-module) with an outgoing link of one of the central modules.

New claim 35, which depends from claim 1, highlights this difference by further reciting that "each of the outgoing links of the input module is associated with an arbiter that is dedicated to the particular outgoing link."

Further, claim 17 includes "means plus function" elements which must be interpreted in light of the

specification. The Examiner impermissibly ignored this structure. As the Court of Appeals for the Federal Circuit has instructed:

The plain and unambiguous meaning of paragraph six is that one construing means-plus-function language in a claim must look to the specification and interpret that language in light of the corresponding structure, material, or acts described therein, and equivalents thereof, to the extent that the specification provides such disclosure. Paragraph six does not state or even suggest that the PTO is exempt from this mandate, and there is no legislative history indicating that Congress intended that the PTO should be. 3 Thus, this court must accept the plain and precise language of paragraph six. See Mansell supra; see also Diamond v. Chakrabarty, 447 U.S. 303, 308 [206 USPQ 193] (1980) ("courts 'should not read into the patent laws limitations and conditions which the legislature has not expressed' "), quoting United States v. Dubilier Condenser Corp., 289 U.S. 178, 199 [17 USPQ 154] (1933). Accordingly, ***because no distinction is made in paragraph six between prosecution in the PTO and enforcement in the courts, or between validity and infringement, we hold that paragraph six applies regardless of the context in which the interpretation of means-plus-function language arises, i.e., whether as part of a patentability determination in the PTO or as part of a validity or infringement determination in a court.*** To the extent that In re Lundberg, 244 F.2d 543, 113 USPQ 530 (CCPA 1979), In re Arbeit, 206 F.2d

947, 99 USPQ 123 (CCPA 1953), or any other precedent of this court suggests or holds to the contrary, it is expressly overruled. [Emphasis added.]

In re Donaldson Co. Inc., 29 U.S.P.Q.2d 1845, 1848 (Fed Cir 1994).

According to one embodiment consistent with the present invention and described in the specification, during the first phase of dispatching queued cells stored in the VOQs, a method is taught for matching a non-empty VOQ 125 with an outgoing link 130 in the input module 120. (See page 14, lines 15-18; also see page 26, lines 10-26; and Figure 8 of the present application.) If the dispatching at a first phase of queued cells at the input module of the Hughes patent is examined, one can find substantial differences compared to the dispatching at a first phase of queued cells at the input module of the present invention.

Specifically, the Hughes patent uses a method wherein a request controller 314 (arbiter) is responsible for selecting queued cells from the VOQs and issuing service requests. The request controller 314 constructs a switch frame 315a-h that is sent to each switch plane 309a-h. Each switch frame 315 contains a number of service requests for selected cells in the input module. (See col.6, lines 64-67, and Figure 3 of the Hughes patent.) The Hughes patent uses the request controller 314 to map the service requests into the switch frames. According to Figure 3 of the Hughes patent, there are 14 ingress/egress ports 304a-n/306a-n, 14 unicast queues 312a-n, one multicast queue 313, and 8 switch frames

315a-h. Each switch frame 315 may map up to 14 service requests for queued cells to their proper ingress port 306. (See Figures 3 and 5; and col.9, lines 19-63 of the Hughes patent.) The switch frames 315 have a request type 506 indicating whether it is a multicast or unicast frame and use a two-bit field to represent the four different service request states (primary request (10), secondary request (01), no cell requesting service (00) and primary request with speedup (11)). (See col.9, lines 64-67; col.10, lines 1-23; col.11, lines 65-67; and Figure 5 of the Hughes patent.) Generally, cells at the head of the line in a queue are deemed as priority and are mapped by the request controller 314 to an initial switch frame. Thus, the initial switch frame comprises a primary service request. The remaining cells in the queue (if any) are non-priority cells (secondary requests) and are mapped sequentially in a round robin fashion across the following switch frames, one secondary request per switch frame. (See col.10, lines 32-67; col.11, lines 1-14; and Figure 5 of the Hughes patent).

On the other hand, an input module 120' of the present invention has VOQs 810a-b which include VOQ arbiters 815a-d for broadcasting service requests to all link controllers 820a-b which include link arbiters 825a-b. Once the link arbiters receive the VOQ requests, they may reply with grants back to the selected VOQ arbiters. Next, the VOQ arbiters receiving a grant may reply with a grant back to a selected link controller. At this point, a VOQ 810, winning arbitration, may be matched with an outgoing link.

From the aforementioned, it is apparent that the two inventions substantially differ in the method and

structure used in the input module for cells requesting service and the process entailed in fulfilling this service. Thus, the structure in the Hughes patent differs substantially from the various "means for matching" described in the specification.

Similarly, independent claim 11 and dependent claims 2, 8, 18 and 23 recite details of VOQ-to-input module output link matching, or details of input module output link-to-central module output link matching. As just described, these details of how matching is performed are not taught by the Hughes patent.

Further, the Hughes patent does not teach that high throughput can be achieved without speedup at the central modules. Although the Hughes patent discusses speedup, it is apparently using speedup in a different context. (The Hughes patent teaches a method wherein a speedup mode is available. Speedup accelerates service for a specific queue. The acceleration is achieved by ensuring that every cell within the queue is mapped as a primary service request (highest priority). Thus speedup applies to a queue rather than a cell wherein all cells in the queue are given the highest priority. (See col.23, lines 41-52.))

Regarding independent claims 11 and 27, the Hughes patent does not teach a method for broadcasting a request for the non-empty VOQ to an arbiter for each of the outgoing links of the input module. The Hughes patent merely teaches a method where a multicast cell may be queued in a multicast queue in the ingress port (input module) and one of the frames may be sent to each of the switch planes per cycle where one frame exists per queued multicast cell. (See col.3, lines 66-67; and col.4,

lines 1-2.) Furthermore, the Hughes patent teaches a method where a request controller 314 (purportedly an arbiter) simply selects from the VOQs which cells are to request service and then implements the service request process for the selected cells. (See col.6, lines 41-44.)

On the other hand, according to some embodiments consistent with the present invention, a method is taught for non-empty VOQs to broadcast requests to an arbiter for each of the outgoing links in the input module. Specifically, each VOQ has an arbiter which broadcasts a request to each of the link arbiters in the input module. A series of requests and grants takes place within the input module until a non-empty VOQ winning arbitration may be matched with an outgoing link. (See, e.g., page 26, lines 10-26 and Figure 8 of the present application.) Again, as mentioned earlier, the portions of the Hughes patent cited by the Examiner all pertain to the matching and interaction taking place between the queued cells in the input module and the central module, not between the queued cells and outgoing links within the input module as claimed.

From the foregoing, it is also apparent that the two inventions differ in structure. Specifically, an embodiment consistent with the present invention has arbiters in every VOQ and link arbiters for every outgoing link within each input port for establishing a match between a non-empty VOQ and an outgoing link (See, e.g., Figure 8.), whereas the Hughes patent only has a single arbiter in each input module for selecting non-empty VOQs and processing requests between the input

module and central module. Hence the two inventions are fundamentally different.

In view of the foregoing, independent claims 1, 11, 17 and 27 are not anticipated by the Hughes patent. Since claims 2-10 and 35 depend, either directly or indirectly, from claim 1, since claims 12-16 depend, either directly or indirectly, from claim 11, since claims 18-26 depend, either directly or indirectly, from claim 17, and since claims 28-33 depend, either directly or indirectly, from claim 27, these claims are similarly not anticipated by the Hughes patent.

Rejections under 35 U.S.C. § 103

Claims 6, 15, 21 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Hughes patent. The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

The Examiner concedes that the Hughes patent does not teach a pointer moving through groups of virtual output queues before moving through virtual output queues in each group. (See Paper No. 11102004, page 7.) The applicants note that this admission precludes the application of the Hughes patents as a section 102 reference against claims 6, 15, 21 and 30. Accordingly, the Examiner's rejection of these claims under 35 U.S.C. § 102 above, is improper.

To compensate for this admitted deficiency of the Hughes patent, the Examiner concludes that it would have been obvious to one skilled in the art that if a pointer is capable of moving through groups of output queues, it is thus capable of moving through each of the groups

before moving through the entire group. The applicants respectfully note that the fact that a reference can be modified to do something is insufficient to show that one skilled in the art would have been motivated to modify the reference to do it. Accordingly, the Examiner has not made a prima facie showing of obviousness.

New claims

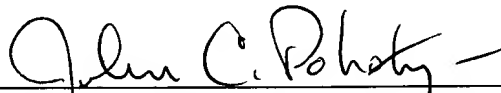
New claim 35 depends from claim 1 and further distinguishes the invention over the Hughes patent as discussed above.

Conclusion

In view of the foregoing amendments and remarks, the applicants respectfully submit that the pending claims are in condition for allowance. Accordingly, the applicants request that the Examiner pass this application to issue.

Respectfully submitted,

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CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)

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